



INVESTOR IN PEOPLE

GB 00/01735

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

10/019971

REC'D 20 JUN 2000

WIPO

PCT

4

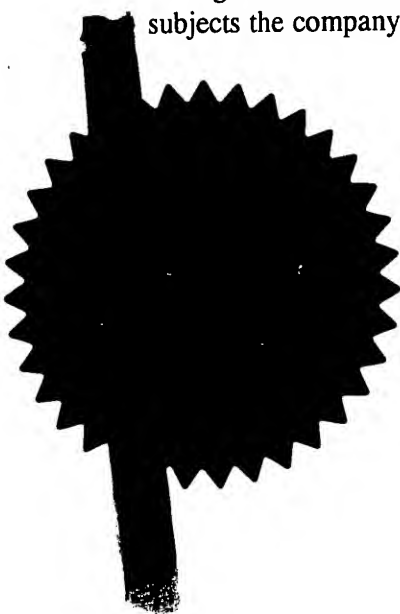
I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

I also certify that by virtue of an assignment registered under the Patents Act 1977, the application is now proceeding in the name as substituted.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

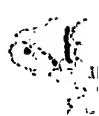


Signed

Dated 30 May 2000

**PRIORITY  
DOCUMENT**

SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)





GB9929111.4

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of

SOUTHFIELDS (FABRIC SYSTEMS) LIMITED,  
Incorporated in the United Kingdom,  
14 Bakewell Road,  
LOUGHBOROUGH,  
Leicesstershire,  
LE11 5TL,  
United Kingdom

[ADP No. 07873540001]



1

2001

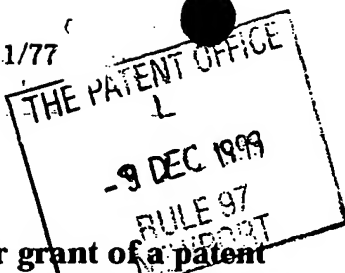
11

1

1

2001

1



The  
Patent  
Office

177  
P01/7700 0.00-9929111.4

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road  
Newport  
South Wales  
NP9 1RH

1. Your reference	P0490		
2. Patent application number <i>(The Patent Office will fill in this part)</i>	9929111.4		09 DEC 1999
3. Full name, address and postcode of the or of each applicant <i>(underline all surnames)</i>	Lorica Research Limited P O Box 17 Malvern Worcestershire WR14 1YN  Patents ADP number <i>(if you know it)</i>  If the applicant is a corporate body, give the country/state of its incorporation United Kingdom		
4. Title of the invention	COMPOSITE FABRIC		
5. Name of your agent <i>(if you have one)</i>	DEREK JACKSON ASSOCIATES The Old Yard, Lower Town Claines Worcester WR3 7RY  Patents ADP number <i>(if you know it)</i>		
6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and <i>(if you know it)</i> the or each application number	Country	Priority application number <i>(if you know it)</i>	Date of filing <i>(day / month / year)</i>
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application		Date of filing <i>(day / month / year)</i>
8. Is a statement of inventorship and of right to grant of a patent required in support of this request? <i>(Answer 'Yes' if:</i> a) <i>any applicant named in part 3 is not an inventor, or</i> b) <i>there is an inventor who is not named as an applicant, or</i> c) <i>any named applicant is a corporate body.</i> See note (d))			

**Patents Form 1/77**

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form 7

Description

Claim(s)

Abstract

Drawing(s) 11

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination (*Patents Form 10/77*)

Any other documents  
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date

8 Dec 1999

12. Name and daytime telephone number of person to contact in the United Kingdom

Derek Jackson - Tel : 01905 755180

**Warning**

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

**Notes**

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

COMPOSITE FABRIC

This invention relates to a composite fabric, such as an architectural fabric.

5

Architectural fabrics generally comprise a textile substrate coated with a polymer. Such materials are used in building construction, usually for roofing and/or partitioning. Architectural fabrics are less permanent than traditional rigid building materials, but for certain applications they have advantages. For example, architectural fabrics can be erected and dismantled more quickly and at lower cost, and they are often suitable for creative new types of design and styles of building such as widespan enclosures and tent constructions in which the fabric is extended and supported in curving and sloping constructions, similar to tents.

15

The textile substrate can comprise, for example, polyester, nylon, glass fibre or aramide (e.g. KEVLAR) fibres which are woven into a fabric. The polymer coating can comprise polyvinylchloride (PVC), polyethylene, polypropylene, polyurethane, polyvinylidene fluoride (PVDF) or polytetrafluoroethylene (PTFE) (e.g. TEFLON).

20

Known architectural fabrics all suffer one or more disadvantages. Known substrates all support combustion with the result that a roof or the like of known

25

architectural fabric can quickly collapse in the event of fire. Most known substrates, especially polyester and aramide substrates, deteriorate when exposed to ultraviolet radiation and can only be provided with opaque coatings.

5 Many substrates, especially nylon are susceptible to creep elongation. Many substrates suffer discoloration due to microbe growth in the interstices of the fabric. It is not possible to weld known substrates: current architectural fabrics are joined by welding the coating which inevitably  
10 results in a weld strength lower than the strength of the substrate.

It is therefore an object of the present invention to provide a composite fabric, such as an architectural  
15 fabric, which eliminates, or at least ameliorates, the above disadvantages.

According to the present invention there is provided a composite fabric comprising a substrate formed of a mesh of  
20 steel cord and a coating applied to the substrate so as to form a continuous sheet adhered to the substrate.

It should be noted the term "cord" as used herein includes cords having one or more strands.

25

The substrate may be woven or unwoven.



The cord may comprise a single strand or multiple strands. Where multiple strands are provided they may be twisted together. The or each strand may have a diameter in the range from 0.05 mm to 1.25 mm. Adjacent strands may be  
5 spaced by 0.05 mm to 10 mm.

The steel may be provided with a corrosion-resistant coating, or may comprise a corrosion-resistant alloy.

10 One or more strands of synthetic material may be incorporated into all or part of the cord or may be inserted intermediate at least some of the adjacent cords.

The coating may comprise a polymeric material, such as a  
15 thermoplastic polymer. The polymeric material may be selected from polyurethane, polyvinylidene fluoride (PVDF) and polytetrafluoroethylene (PTFE). The polymeric material may incorporate at least one additional component. The  
20 additional component(s) may be selected from fillers, plasticisers, stabilisers, flame retardants, lubricants, pigments and dyes. The coating may be applied to the substrate by one or more of laminating and liquid extrusion.

25 For a better understanding of the present invention and to show more clearly how it may be carried into effect reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 is a plan view of one embodiment of a composite fabric according to the present invention; and

Figure 2 a side view of the composite fabric shown in Figure 1.

The composite fabric shown in Figures 1 and 2 is intended for use as an architectural fabric and comprises a substrate in the form of a mesh of steel cord 1 to which is applied a coating 3 of a suitable polymeric material to form a continuous sheet adhered to the substrate. However, it should be noted the composite fabric has other uses than as an architectural fabric, such as floating water tanks for towing fresh water at sea, vandal-resistant coverings for seating, lifting/carrying bags for heavy, sharp materials such as aggregates, gravel, broken stone and the like, thief- and vandal-resistant and accidental-damage-resistant canvasses and coverings such as for open decks of moored marine craft and road and rail transporters, rip- and perforation-resistant inflatable marine craft (particularly so-called rigid inflatables), and reservoir linings.

The steel cord 1 is a mesh or fabric, with the steel cord suitably being in the form of a plurality of strands which may be twisted together. The number of strands will depend on the requirements for any particular application, but can readily be determined. For example, nine or twelve strands

are particularly convenient, with the strands being twisted first in small groups (say three or four, or initially into groups of two and subsequently into groups of four) and the groups then being twisted together. The or each strand may  
5 have a diameter in the range of, for example, 0.05 mm to 1.25 mm, with adjacent cords being spaced by, for example, 0.05 mm to 10 mm. The mesh or fabric may be in the form of a plain or twill weave in which warp and weft cords pass under and over each other, an unwoven configuration in  
10 which the cords simply pass over each other, or may be knitted. The cords may be all of the same diameter or the warp cords may have a greater diameter than the weft cords. Alternatively, the weft cords may have a greater diameter than the warp cords.

15  
Ideally the steel is provided with a corrosion-resistant coating, for example it may be galvanised, or the steel comprises a corrosion-resistant alloy, such as stainless steel. Where coated, the steel may be a low carbon steel  
20 having a carbon content of about 0.7 percent by weight. In order that the coating should adhere more firmly to the steel cord, synthetic fibres (such as those conventionally used in architectural fabrics, e.g., nylon or polyester) can be incorporated into all or part of the cord or can be  
25 inserted intermediate the warp and/or weft cords.

Steel cords as described possess high tensile strength and high resistance to any kind of damage, whether accidental

or deliberate and whether physical or due to exposure to the environment.

5 The coating 3 comprises a suitable polymeric material, for example a thermoplastic material such as polyurethane (possibly with a flame-retardant finish), PVDF or PTFE. The polymeric material may incorporate one or more additional constituents such as fillers, plasticisers, stabilisers, flame retardants, lubricants, pigments and  
10 dyes. The coating is applied by laminating the coating to the surfaces of the substrate, or by liquid extrusion onto the substrate, or indeed by a combination of extrusion and lamination. Thus, the coating may be transparent, translucent or opaque, may have a gloss or matt finish, may  
15 be left uncoated or may be covered with a lacquer or may have a textile material laminated thereto (such as natural (e.g., cotton) or synthetic).

The steel cord substrate does not support combustion.  
20 Thus, although the coating 3 would degenerate in a fire, the steel cord substrate 1 would remain erect longer than a substrate of conventional material. The extension of a building structure in the event of a fire, even if only by one or two minutes, could save lives.

25

A steel cord substrate has the advantage that it is completely unaffected by sunlight, thus permitting the use of clear, colourless coatings or of highly translucent

coloured coatings. The steel cord permits the substrate to have an open mesh structure with the cords relatively widely spaced allowing the ready passage of light.

5 A steel cord is additionally relatively immune to creep elongation and does not support microbe growth. Moreover, a steel cord substrate offers greater security in that it is more difficult to cut the fabric in order to effect unauthorised entry.

10

A particular advantage of the use of a steel cord is that the material of the substrate becomes weldable thereby resulting in a seam strength substantially the same as that of the substrate itself. This is a very significant  
15 advantage over known substrate materials.



1/1

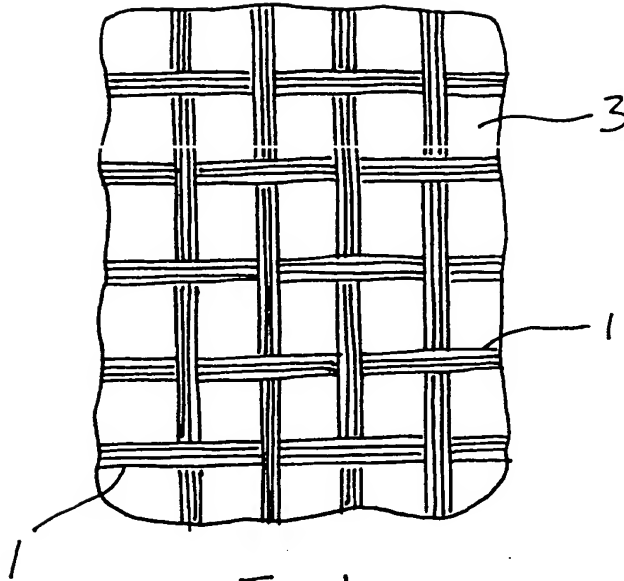


Fig. 1

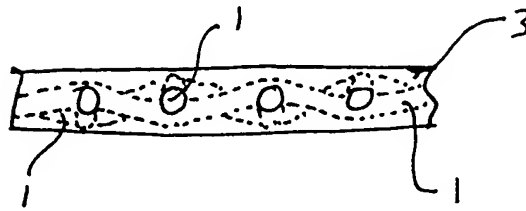


Fig. 2

PCT / GB00 / 01735

DEREK ~~\$\$\$~~ JACKSON ASSOC